

**DAVID R. CLARKE**

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**DEGREES AWARDED**

B.Sc. (First Class Honors), Applied Sciences, Sussex University, England, 1968

Ph.D. Physics, Cambridge University, 1974

**PROFESSIONAL APPOINTMENTS:**

- 2013-present Inaugural holder, Extended Tarr Family Chair of Materials, Harvard University
- 2009-2013 Gordon McKay Professor of Materials and Applied Physics, Harvard University
- 1990-2009 Professor of Materials and Professor of Mechanical Engineering, University of California, Santa Barbara.
- 1991-1998 Chair, Materials Department, UCSB
- 1983-1990 Senior Manager, Materials Science Department, IBM Research Division, NY.
- 1982-1983 Associate Professor, Materials Science and Engineering Department, M.I.T.
- 1977-1982 Member of Technical Staff, Rockwell International Science Center,  
Thousand Oaks, CA.
- 1974-1977 Lecturer, Materials Science and Mineral Engineering Department, UC Berkeley.
- 1968-1974 Scientific Officer, then Senior Scientific Officer, National Physical Laboratory,  
England.

**AWARDS AND HONORS**

- James Mueller Award, Engineering Ceramics Division, American Ceramic Society, 2014
- Distinguished Life Member of the American Ceramic Society (ACS), 2009
- Author of one of the 11 most significant papers in the 110 years of publication on Ceramics
- New Materials Award, 2008, from the National Institute of Materials Science (Japan), (jointly with A. G. Evans and C. G. Levi, UCSB).
- Edward C. Henry Award, Electronics Division, American Ceramics Society, 1999
- Sosman Memorial Award, American Ceramics Society, 1999
- Van Horn Lectureship, Case Western Reserve University, 1999

- Elected to the National Academy of Engineering in 1999
- Morrison Lectureship, Brockhouse Institute, McMaster University, 1998
- Academician, International Academy of Ceramics, 1995
- Doctor of Science, University of Cambridge, 1994
- Alexander von Humboldt Foundation Senior Scientist Award, 1992
- Richard M. Fulrath Pacific Memorial Award, 1989
- Fellow of the American Physical Society, 1986
- Fellow of the American Ceramic Society, 1985
- The Ross Coffin Purdy Award of the American Ceramic Society, 1982

**NUMBER OF PUBLICATIONS IN PEER REVIEWED CONFERENCES AND JOURNALS:** 400 +

**PATENTS:** 11 issued + 3 provisional filings under consideration

Lange, Frederick, F., David R. Clarke, ["United States Patent: 4,457,958 - Method of Strengthening Silicon Nitride Ceramics,"](#) July 3, 1984.

Clarke, David R., ["United States Patent: 4,466,820 - Electrolysis Treatment for Drawing Ions out of a Ceramic,"](#) August 21, 1984.

Adams, Richard W., Jr., David R. Clarke, Sara H. Knickerbocker, Linda L. Rapp, Bernard Schwartz, ["United States Patent: 5,045,402 - Zirconia Toughening of Glass-Ceramic Materials,"](#) September 3, 1991.

Acocella, John, Peter A. Agostino, Arnold I. Baise, Richard A. Bates, Ray M. Bryant, Jon A. Casey, David R. Clarke, et al., ["United States Patent: 5,135,595 - Process for Fabricating a Low Dielectric Composite Substrate,"](#) August 4, 1992.

Acocella, John, Arnold I. Baise, Richard A. Bates, Jon A. Casey, David R. Clarke, et al., ["United States Patent: 5,139,851 - Low Dielectric Composite Substrate,"](#) August 18, 1992.

Adams, Richard W., Jr., David R. Clarke, Sarah H. Knickerbocker, Linda L. Rapp, Bernard Schwartz, ["United States Patent: 5,173,331 - Zirconia Toughening of Glass-Ceramic Materials,"](#) December 22, 1992.

Adams, Richard W., Jr., David R. Clarke, Sarah H. Knickerbocker, Linda L. Rapp, Bernard Schwartz, ["United States Patent: 5,185,215 - Zirconia Toughening of Glass-Ceramic Materials,"](#) February 9, 1993.

David R. Clarke, 2016 CV

Acocella, John, Peter A. Agostino, Arnold I. Baise, Richard A. Bates, Ray M. Bryant, Jon A. Casey, David R. Clarke, et al., "[United States Patent: 5,277,725 - Process for Fabricating a Low Dielectric Composite Substrate.](#)" January 11, 1994.

Paton, Neil E., Kenneth S. Murphy, David R. Clarke, "[United States Patent: 6,072,568 - Thermal Barrier Coating Stress Measurement.](#)" June 6, 2000.

Clarke, David R., Frederick F. Lange, "[United States Patent: 6,087,971 - Method of Fabricating an Improved Ceramic Radome.](#)" July 11, 2000.

Rigney, Joseph D., David R. Clarke, Ramgopal Darolia, "[United States Patent: 7,070,866 - Nickel Aluminide Coating with Improved Oxide Stability.](#)" July 4, 2006.

### **EDITORIAL SERVICE**

- Editor, *Annual Reviews of Materials Research* (since 1997)
- Associate Editor, *Journal of the American Ceramic Society* (since 1986)

### **RECENT PROFESSIONAL SERVICE**

Peer Committee, Section 9, National Academy of Engineering (since 2013)

Member, Radiation Source Use and Replacement Committee, NRC (2006/07),

Member of Solid State Sciences Committee of the National Research Council (1999-2003),

Member, Smaller Facilities Committee, National Research Council (2003-2006).

Visiting Committees for Materials Departments: U. Michigan; The Technion, Israel; U. Korea,

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## Clarke Group Publications Related to Thermal Barrier Coatings for Gas Turbines

**Vibration Damping of Thermal Barrier Coatings Containing Ductile Metallic Layers**, F. Casadei, K. Bertoldi and D. R. Clarke, *Journal of Applied Mechanics*, **81** 101001 (2014).

**Thermal Conductivity of Single and Multi-phase Compositions in the ZrO<sub>2</sub>-Y<sub>2</sub>O<sub>3</sub>-Ta<sub>2</sub>O<sub>5</sub> System**, A. M. Limarga, S. Shian, R. M. Leckie, C. G. Levi and D. R. Clarke, *Journal of the European Ceramic Society*, **34** [12] 3085-3094 (2014).

**The Tetragonal-Monoclinic, Ferroelastic Transformation in Yttrium Tantalate and the Effect of Zirconia Alloying**, S. Shian, P. Sarin, M. Gurak, M. Baram, W. M. Kriven and D. R. Clarke, *Acta Materialia*, **69** 196-202 (2014).

**First Principles Calculations of the High Temperature Phase Transformation in Yttrium Tantalate**, J. Feng, S. Shian, B. Xiao and D. R. Clarke, *Physical Review B*, **90** 094102 (2014).

**Turbine Materials and Mechanics**, A. G. Evans, C. G. Levi and D. R. Clarke, in *Turbine Aerodynamics, Heat Transfer, Materials and Mechanics*, Edited by T. Shih and V. Yang. American Institute of Astronautics and Aeronautics (2014).

**Finite Element Study of Multi-Modal Vibration Damping for Thermal Barrier Coatings**, F. Casadei, K. Bertoldi and D. R. Clarke, *Computational Materials Science*, **79** 908-917 (2013).

**Thermal-barrier coatings for more efficient gas-turbine engines**, D. R. Clarke, M. Oechsner, N. P. Padture, *MRS Bulletin*, **37** 891-898 (2012).

**Effect of High Temperature Aging on the Thermal Conductivity of Nanocrystalline Tetragonal Yttria-Stabilized Zirconia**, A. M. Limarga, S. Shian, M. Borom and D. R. Clarke, *Acta Materialia*, **60** 5417-5424 (2012)

**Anisotropic Elastic and Thermal Properties of the Double Perovskite Slab - Rocksalt Layer Natural Superlattice Structure**, J. Feng, B. Xiao, R. Zhou, W. Pan and D. R. Clarke, *Acta Materialia*, **60** 3380-3392 (2012).

**Calculation of the Thermal Conductivity of Ln<sub>2</sub>SrAl<sub>2</sub>O<sub>7</sub> (Ln = La, Nd, Sm, Eu, Gd and Dy)**, J. Feng, C. Wan, B. Xiao, R. Zhou, W. Pan and D. R. Clarke, *Physical Review B* **84** 024302 (2011).

**Stress Distributions in Plasma Sprayed Thermal Barrier Coatings under Thermal Cycling in a Temperature Gradient**, A. M. Limarga, R. Vassen and D. R. Clarke, *Journal of Applied Mechanics*, **78** 0118003-1/9 (2011).

**The Use of Larson-Miller Parameters to Monitor the Evolution of Raman Lines of Tetragonal Zirconia with High Temperature Aging**, A. M. Limarga, J. Iveland, M. Gentleman, D. M. Lipkin and D. R. Clarke, *Acta Materialia*, **59** 1162-1167 (2011).

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**Damage Evolution in Thermal Barrier Coatings with Thermal Cycling**, B. Heeg, V. K. Tolpygo and D. R. Clarke, *Journal of the American Ceramic Society*, **94** [6] S112-S119 (2011).

**Thermal Conductivity of the Gadolinium Calcium Silicate Apatites: Effect of Different Point Defect Types**, Z. Qu, T.D. Sparks, W. Pan and D. R. Clarke, *Acta Materialia*, **59** 3841-3850 (2011).

**The Grain Size and Temperature Dependence of the Thermal Conductivity of Polycrystalline, Tetragonal Yttria-Stabilized Zirconia**, A. Limarga and D. R. Clarke, *Applied Physics Letters*, **98** 211906 (2011).

**Resistance to Moisture-Induced Low-Temperature Degradation of Equi-Molar  $YO_{1.5}$ - $TaO_{2.5}$  Stabilized Tetragonal Zirconia**, Y. Shen and D. R. Clarke, *Journal of the American Ceramic Society*, **93** [7] 2024-2027 (2010).

**Anisotropic Thermal Diffusivity and Conductivity of La-doped Strontium Niobate,  $Sr_2Nb_2O_7$** , T. D. Sparks, P. A. Fuierer and D. R. Clarke, *Journal of the American Ceramic Society*, **93** [4] 1136-1141 (2010).

**Low Thermal Conductivity Without Oxygen Vacancies in Equi-Molar  $YO_{1.5}$ - $TaO_{2.5}$  and  $YbO_{1.5}$ - $TaO_{2.5}$  Stabilized Zirconia Ceramics**, Y. Shen, R. M. Leckie, C. G. Levi and D. R. Clarke, *Acta Materialia*, **58** 4424-4431 (2010).

**Thermal Conductivity of the Rare-Earth Strontium Aluminates**, C. Wan, T. D. Sparks, P. Wei and D. R. Clarke, *Journal of the American Ceramic Society*, **93** [5] 1457-1460 (2010).

**A New Data Reduction Method of Pulse Diffusivity Measurements on Layered Materials**, L. G. Chen, A. M. Limarga and D. R. Clarke, *Computational Materials Science*, **50** 77-82 (2010).

**The Tetragonal-Monoclinic Transformation in Zirconia: Lessons Learned and Future Trends**, J. Chevalier, L. Gremillard, A. V. Virkar and D. R. Clarke, *Journal of the American Ceramic Society*, **92** [9] 1901-1920 (2009).

**Evolution of Thermal Properties of EB-PVD 7YSZ Thermal Barrier Coatings with Thermal Cycling**, T. Kakuda, A. M. Limarga, T. D. Bennett and D. R. Clarke, *Acta Materialia*, **57** [8] 2583-2591 (2009).

**Doped Oxides for High Temperature Luminescence and Lifetime Thermometry**, M. D. Chambers and D. R. Clarke, *Annual Reviews of Materials Research*, **39** 325-359 (2009).

**Decay Pathway and High-Temperature Luminescence of  $Eu^{3+}$  in  $Ca_2Gd_8Si_6O_{26}$** , M. D. Chambers, P. A. Rousseve and D. R. Clarke, *Journal of Luminescence* **129** 263-269 (2009).

**A Numerical Solution Based Parameter Estimation Method for Thermal Flash Diffusivity Measurements**, L. G. Chen and D. R. Clarke, *Journal of Computational Materials Science*, **45** [2] 342-348 (2009).

**Oxides for High Temperature Vibration Damping of Turbine Coatings**, D. R. Clarke, **in press**.

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